

Jan Ondřej

Trinity College Dublin
School of Computer Science and Statistics
Stack B
CHQ, IFSC,
Dublin, Ireland
jan.ondrej@scss.tcd.ie
www.scss.tcd.ie/Jan.Ondrej
[Google Scholar](#)

My research interests are in interactive computer graphics, animation and virtual reality. In particular, I am interested in research involving virtual humans and crowds (navigation, animation, rendering, and interaction in VR/AR).

My main research focus is on developing novel algorithms for behavioural simulation, animation and rendering of virtual humans, which involves the use of motion capture and GPU programming. I have experience in conducting perceptual experiments as part of my work on several recent projects that studied how people perceive the motions, body shapes and behaviours of virtual humans.

I have collaborated on cross-disciplinary projects with neuroscientists, doctors and teachers, where I applied my knowledge of crowd simulation, animation and computer graphics to design and develop applications for treatment and training purposes in VR. My research has involved research and advanced software development on a variety of visualization platforms (monitor, AR setup and VR).

Education

- 15/02/2008 –
15/05/2011 **Institut National des Sciences appliquées de Rennes (INSA)**
PhD in Computer Science,
Topic: Modelling and planning a realistic navigation for autonomous virtual humans.
Supervisor: Julien Pettré
- 01/10/2001 –
28/02/2007 **Czech Technical University in Prague**
Masters in Computer Science and Engineering, Computer Graphics
Diploma Thesis: Analytical model for light scattering in fog

Training

- 2016 Human Subject Research (on line CITI course)

Experience

- 01/09/2016 –
current **Senior Research Fellow at Trinity College Dublin** on V-SENSE project
Research and development of new algorithms for Free Viewpoint Video, Interaction methods for VR and AR, and Character Animation.
- 04/08/2014 –
04/08/2016 **Postdoctoral Researcher at Disney Research Los Angeles**
Researching new crowd simulation, visualization and validation methods. Conducting experiments to study perception of motions, body shapes and behaviours of virtual characters and crowds. This research involves designing scenarios and preparing assets of virtual environments, animations and characters for state-of-the-art game engines (Ogre3D, Unreal Engine 4) and running experiments on various platforms (Monitor, eye tracking, CAVE).

Co-supervised summer interns on research projects involving activity recognition and classification of human behaviour.

Developed a framework for 3D visualization of real-time sensor data for debugging, visualization and presentation purposes using Unreal Engine 4.

01/10/2011 –
30/07/2014

Postdoctoral Researcher at Trinity College Dublin on VERVE project (EU FP7 research project).

Researched new methods for crowd behaviour simulation and authoring interfaces. Applied the results to deploy virtual humans and crowds for the benefit of people who are at risk of social exclusion, because of ageing, a neurological disorder, or general anxiety. This research involved the use of motion capture (VICON) and state-of-the-art algorithms to enhance the believability of crowd rendering, animation and behaviour simulation on a variety of visualization platforms (Monitor, Oculus Rift HMD, stereo wall).

01/09/2011 –
30/09/2011

Research Engineer at IRISA / INRIA Rennes on SignCom project

Research and development of an application for conversation in sign language. Worked on motion capture (VICON) and editing of sign language gestures and implementation of network interface between gesture recognition and gesture generation software.

15/02/2008 –
15/06/2011

PhD Candidate at IRISA/INRIA Rennes on French ANR Locanthrope project.
Topic: Modelling and Planning a Realistic Navigation for Autonomous Virtual Humans

Researched collision avoidance (CA) methods for autonomous agents and crowds. The research involved motion capture (VICON) and analysis of human locomotion during various collision avoidance situations, building novel CA models and the use of motion capture data for calibration and validation. To ensure real-time performance the models were implemented using C++ and General purpose programming on GPU (CUDA).

01/04/2007 –
14/02/2008

Research Engineer at Czech Technical University in Prague

Researcher engineer on ARiSE: Augmented Reality in School Environments project (EU FP6 research project).

Developed Augmented Reality (AR) applications using Scheme language to serve as a teaching tool in secondary school physics classes and collaborated on a research of human-computer interaction methods for AR.

01/05/2005 –
31/02/2006

Software Development for UPEK (freelancer)

Developed a driver and BioAPI BSP for fingerprint device in Linux.

Research Grants

SAUCE: Smart Asset re-Use in Creative Environments, Horizon 2020 – ICT, Co-PI, (2017-2020)

Professional Activities

Organizing Committee

Motion in Games 2013 (Poster chair)

Program Committee

Spring Conference on Computer Graphics 2012

Virtual Humans and Crowds for Immersive Environments 2016, 2017

Motion in Games 2016, 2017

Journal Refereeing

ACM Transaction on Graphics

IEEE Transactions on Visualization and Computer Graphics

Transaction on Applied Perception

Computer Animation and Virtual Worlds

The Visual Computer

WIREs Cognitive Science

Conference Refereeing

SIGGRAPH

SIGGRAPH Asia

Pacific Graphics

Motion in Games

Spring Conference on Computer Graphics

Supervision Experience

Interns at Disney Research (co-supervised with Prof. Carol O'Sullivan and Dr. He Wang) (2015-16)

Max Gilbert (U. Penn)

Weizi Li (UNC Chapel Hill)

Chonhyon Park (UNC Chapel Hill)

PhD students

Rowan Hughes (TCD, co-supervised with Prof. John Dingliana) (PhD 2017)

Teaching

16-17: Computer Graphics - 4th Year TCD B.A. in Computer Science (Labs)

16-17: Real-Time Animation - Masters Students, TCD (Lectures)

Skills

Programming Languages – C, C++, (Expert), C#, Java, Lua, Python (Basic)

APIs – OpenGL, HLSL, GLSL (Expert), Unreal Engine 4, Unity, Ogre3D, Qt, GLUT (Advanced), OpenCV, OpenMP, CUDA (Basic)

Software – MS Visual Studio, Matlab, NaturalMotion Morpheme, Autodesk 3DS Max, Maya and Motion Builder

Motion Capture Systems – VICON IQ and Blade (Advanced)

Eye tracking – SMI RED

Publications

Book Chapters

Teófilo Bezerra Dutra, Ricardo Marques, Julien Pettré, **Jan Ondřej**. *Vision Based Local Collision Avoidance*. In Game Engine Gems, Volume 3, A K Peters / CRC Press 2016 (Book Chapter)

Journal Publications

He Wang, **Jan Ondřej**, Carol O'Sullivan. *Path Patterns: Analyzing and Comparing Real and Simulated Crowds*, IEEE Transactions on Visualization and Computer Graphics, 2016

Niamh A. Merriman, **Jan Ondřej**, Alicia Rybicki, Eugenie Roudaia, Carol O'Sullivan, Fiona N. Newell. *Crowded environments reduce spatial memory in older but not younger adults*, Psychological Research, 2016

Marine Taffou, **Jan Ondřej**, Carol O'Sullivan, Olivier Warusfel, Isabelle Viaud-Delmon. *Judging crowds' size by ear and by eye in virtual reality*, Journal on Multimodal User Interfaces, 2016

Jan Ondřej, Cathy Ennis, Niamh Merriman, Carol O'Sullivan. *FrankenFolk: Distinctiveness and Attractiveness of Voice and Motion*, ACM Transaction on Applied Perception 2016

Marine Taffou, **Jan Ondřej**, Carol O'Sullivan, Olivier Warusfel, Stéphanie Dubal, Isabelle Viaud-Delmon. *Multisensory aversive stimuli differentially modulate negative feelings in near and far space*, Psychological Research 2016

Valeria Manera, Emmanuelle Chapoulie, Jérémy Bourgeois, Rachid Guerchouche, Renaud David, **Jan Ondřej**, George Drettakis, Philippe Robert. *MeMo2: A feasibility study with image-based rendered Virtual Reality in patients with Mild Cognitive Impairment and dementia*, PLOS ONE, 2016

Niamh A. Merriman, **Jan Ondřej**, Eugenie Roudaia, Carol O'Sullivan, Fiona N. Newell. *Familiar environments enhance object and spatial memory in both younger and older adults*. Experimental Brain Research, 2016

Richard Kulpa, Anne-Hélène Olivier, **Jan Ondřej**, Julien Pettré. *Imperceptible Relaxation of Collision Avoidance Constraints in Virtual Crowds*, ACM Transactions on Graphics (TOG) - Proceedings of ACM SIGGRAPH Asia 2011, December 2011.

Yijiang Zhang, Julien Pettré, **Jan Ondřej**, Xueying Qin, Qunsheng Peng, Stéphane Donikian. *Online Inserting Virtual Characters into Dynamic Video Scenes*, Computer Animation and Virtual Worlds, John Wiley & Sons, Ltd, October 2011.

Jan Ondřej, Julien Pettré, Anne-Hélène Olivier, Stéphane Donikian. *A Synthetic-Vision-Based Steering Approach for Crowd Simulation*, ACM Transactions on Graphics - Proceedings of ACM SIGGRAPH 2010, 2010.

Conference Papers

Chloe Shi, **Jan Ondřej**, He Wang, Carol O'Sullivan. *Shape Up! Perception based body shape variation for data-driven crowds*, IEEE VR 2017 Workshop on Virtual Humans and Crowds in Immersive Environments, 2017

Chonhyon Park, **Jan Ondřej**, Max Gilbert, Kyle Freeman, Carol O'Sullivan. *HI Robot: Human Intention-aware Robot Planning for Safe and Efficient Navigation in Crowds*, IEEE/RSJ International Conference on Intelligent Robots and Systems, 2016

He Wang, **Jan Ondřej**, Carol O'Sullivan. *Path Patterns: Analyzing and Comparing Real and Simulated Crowds*, i3D 2016: ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games, 2016

Rowan Hughes, **Jan Ondřej**, John Dingliana. *DAVIS: Density-Adaptive Synthetic-Vision Based Steering for Virtual Crowds*, MIG '15: Proceedings of the 8th International ACM SIGGRAPH Conference on Motion in Games, 2015

Marine Taffou, **Jan Ondřej**, Carol O'Sullivan, Olivier Warusfel, Stéphanie Dubal, Isabelle Viaud-Delmon. *Auditory-Visual Virtual Environment for the Treatment of Fear of Crowds*, VRIC'15, Laval, France, April 2015

Rowan Hughes, **Jan Ondřej** and John Dingliana, *Holonomic Collision Avoidance for Virtual Crowds*, SCA '14: Eurographics/ ACM SIGGRAPH Symposium on Computer Animation, July 2014, 103-111

Niamh Merriman, **Jan Ondřej**, Eugenie Roudaia, Carol O'Sullivan and Fiona Newell, *Familiar Environments Enhance Object and Spatial Memory in both Younger and Older Adults*, ANFA '14: Academy of Neuroscience for Architecture, September 2014

Yijiang Zhang, Julien Pettré, **Jan Ondřej**, Qin Xueying, Qunsheng Peng, Stéphane Donikian. *Mixed Reality Crowds: Online Inserting Virtual Characters into Dynamic Video Scenes*, CASA 2011.

Anne-Hélène Olivier, **Jan Ondřej**, Julien Pettré, Richard Kulpa, Armel Crétual. *Interaction between Real and Virtual Humans during Walking: Perceptual Evaluation of a Simple Device*, APGV '10: Proceedings of the 7th Symposium on Applied Perception in Graphics and Visualization, 2010.

Julien Pettré, **Jan Ondřej**, Anne-Hélène Olivier, Armel Crétual, Stéphane Donikian. *Experiment-based modelling, simulation and validation of interactions between virtual walkers*, SCA '09: Proceedings of the ACM SIGGRAPH/Eurographics Symposium on Computer Animation, 2009.

Posters

Rowan Hughes, **Jan Ondřej**, John Dingliana. *Experiment-based Modelling and Simulation of Holonomic Collision Avoidance Strategies for Virtual Humans*, Motion in Games 2013, November 2013.

Niamh Merriman, **Jan Ondřej**, Carol O'Sullivan, Fiona Newell. *The role of environment familiarity on spatial memory for novel objects: An ageing study*. Proceedings of the 36th European Conference on Visual Perception, Bremen, Germany, August 2013.

Julien Pettré, **Jan Ondřej**, Anne-Hélène Olivier, Armel Crétual, Alain Berthoz. *Experimental study on interactions between walkers having crossing trajectories. Part I. Experimental Setup*, Gait and Posture 2009, Posters, 2009.

Technical Reports

Rowan Hughes, **Jan Ondřej**, Guarev Chaurasia. *Sketch-Based Annotation and Authoring of Geometrically Sparse 3D Environments*, Trinity College Dublin, 2013